

How to find Martian Hydrothermal Systems

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What is the best strategy for finding hydrothermal systems on Mars? A study conducted by the Australian Centre of Astrobiology (ACA) and the Commonwealth Scientific and Industrial Research Organisation (CSIRO) on remote sensing of hydrothermal systems is due to be completed this year. The methods used are similar to those to be employed by the Compact Reconnaissance Infrared Spectrometer for Mars (CRISM) which will launch onboard Mars Reconnaissance Orbiter (MRO) in August (Murchie *et al.*, 2004).

The project involved the collection of a 600 km² airborne hyperspectral dataset covering the Visible - Near Infrared to Short Wave Infrared (VNIR-SWIR: 0.4-2.4 microns) region of the electromagnetic spectrum. The geographic region covered includes parts of the 3.5Ga Warrawoona Group in the Early Archean East Pilbara Granite-Greenstone Terrain (EPGGT) (Brown *et al.*, 2004). This region of the EPGGT contains a relatively well preserved volcanic terrane, which is similar in many ways to the flood basalts of Mars, shows evidence for two Early Archean hydrothermal events, and contains the Earth's earliest microfossils (Schopf, 1993).

A summary of the results of this work will be presented, including new methods for the recognition of hydrothermal mineral signatures on Mars, localization of possible hot spots indicated by changes in geochemistry, and (should large hydrothermal sites be found by CRISM) strategies for determining the best landing sites for the 2009 MSL lander.

References

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